Unit 15
Day 4
Integer Roots

Fundamental theorem of Algebra:

Every polynomial of degree 1 or more has at least one complex zero (root).

Number of zeros theorem:

A polynomial of degree **n** has at most **n** distinct zeros.

Find the integral roots (zeros, solutions):

1) $P(x)=x^3+3x^2-25x-75$

# of possible zeros? 3

possible integer zeros:

$\pm 1, \pm 3, \pm 5, \pm 15, \pm 25, \pm 75$

	1	3	-25	-75
				-75
0				
1	1	4	-21	-96
-1	1	2	-27	-48
3	1	6	-7	-21
-3	1	0	-25	0

$P(x)=(x+3)(x^2-25)$

$P(x)=(x+3)(x-5)(x+5)$

$0=(x+3)(x-5)(x+5)$

$X=\{-3,5,-5\}$

$x^2+3x+2=0$

$(x+2)(x+1)=0$

$x=-2 \quad x=-1$

| . . . —

. . . —

2) $x^4-11x^2-18x-8=0$

# of possible solutions? 4

possible integer solutions:

$\pm 1, \pm 2, \pm 4, \pm 8$

	1	0	−11	−18	−8
1					−36
−1	1	−1	−10	−8	0

$P(x)=(x+1)(x^3-x^2-10x-8)$

	1	−1	−10	−8
2	1	1	2	−4
−2	1	−3	−4	0

$P(x)=(x+1)(x+2)(x^2-3x-4)$

$P(x)=(x+1)(x+2)(x-4)(x+1)$

$X=\{-1,-2,4,-1\}$

$X = \{-1, -2, 1, -\}$

3) $P(x)=x^3-7x^2+17x-15$

# of possible roots?

possible integer roots:

HW Wksht 1-8 all